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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

LITTLE PANACHE LAKE

DISTRICT OF SUDBURY

1968

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1968  
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Little Panache Lake pollution  
survey report, 1968 : district of  
Sudbury, unorganized townships  
of Louise and Dieppe.

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LITTLE PANACHE LAKE  
POLLUTION SURVEY REPORT  
1968

DISTRICT OF SUDBURY  
UNORGANIZED TOWNSHIPS OF  
LOUISE AND DIEPPE

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ONTARIO WATER RESOURCES COMMISSION  
DIVISION OF SANITARY ENGINEERING

LITTLE PANACHE LAKE  
POLLUTION SURVEY REPORT

INTRODUCTION:

On August 19, 1968 the Sudbury & District Health Unit reported that several complaints had been received concerning foul conditions in Little Panache Lake. As a result of similar complaints received in the fall of 1967, the Biology Branch of the Division of Laboratories was requested to conduct a biological survey of the lake during the summer of 1968. At the time the above complaints were reported, the field work for the survey was approximately half completed. Because the preliminary results indicated that severe algae blooms were being caused by unnaturally high nutrient concentrations, a pollution survey of the Little Panache Lake area was carried out to determine the source of the nutrients.

SUMMARY:

From the results of the biological and pollution surveys, it is concluded that the process of eutrophication has been greatly accelerated by the waste water disposal practices in the watershed area. The dumping of wash water directly into the lake and the improper disposal of sink wastes on the surface of the soil close to the lake has increased the phosphate content of the water and the bottom mud. Improperly

constructed and malfunctioning septic tanks and pit privys in some areas have also contributed to the nutrient increase in Little Panache Lake. Because the lake is essentially land-locked, the nutrients are trapped in the basin and enter into the biological cycles of the lake.

In order to prevent the algae blooms associated with eutrophication from becoming worse, it is imperative that all artificial inputs of nutrients be stopped by the provision of proper disposal systems for each residence. All waste waters including laundry, sink and sanitary wastes must be directed to the disposal systems.

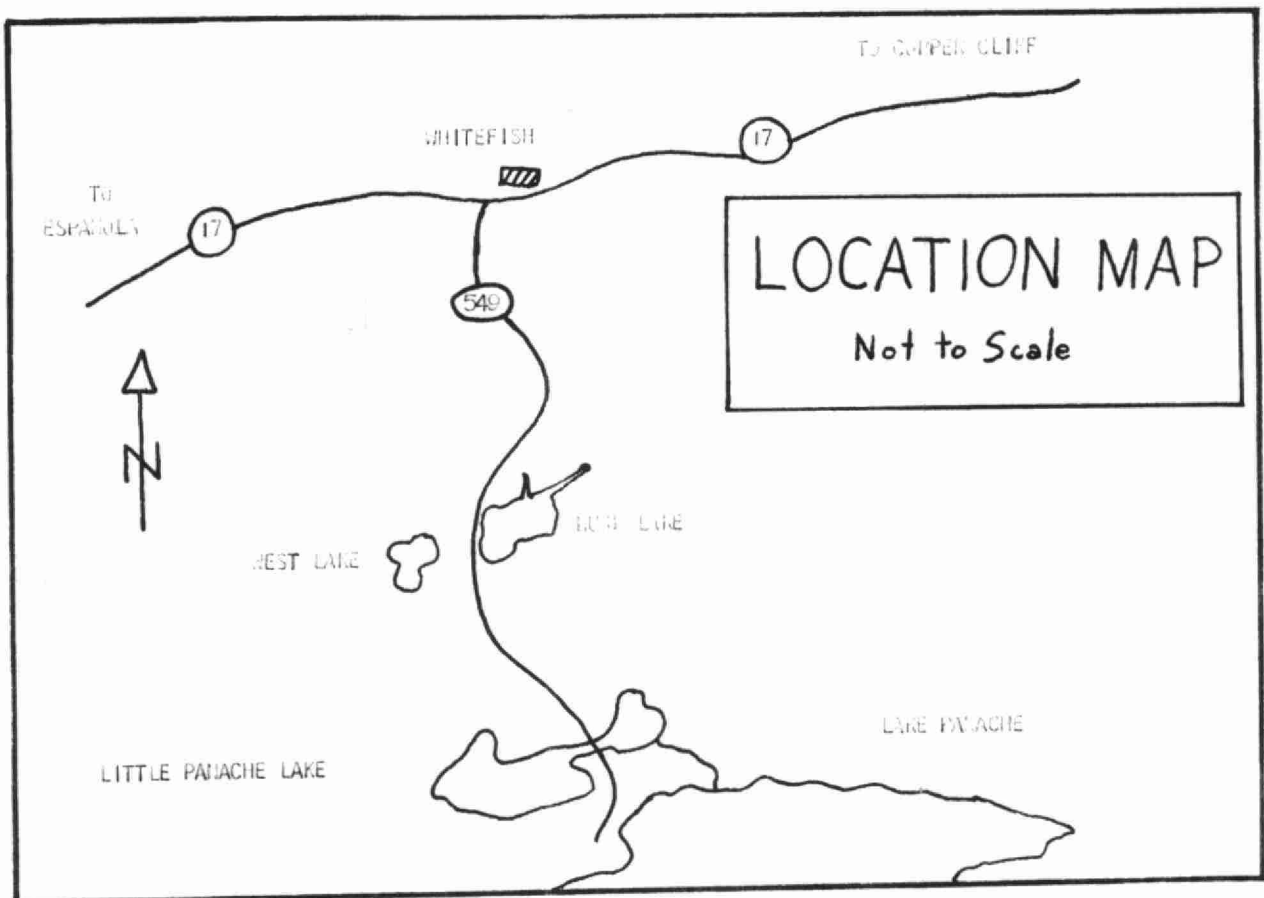
Although the use of an algicide such as copper sulphate can delay the advent of an algae bloom temporarily, there is no known way at the present time of preventing their occurrence.

#### DESCRIPTION OF LAKE:

Little Panache Lake is located in the District of Sudbury approximately 22 miles southwest of the City of Sudbury. It lies in the unorganized Townships of Louise and Dieppe and is crossed at its narrowest part by Highway 549.

The lake has a total surface area of approximately 339 acres made up as follows: 262 acres in the western portion and 77 acres in the eastern portion. There are no tributaries

to the lake. It was reported, however, that a swampy area to the west of the lake has been colonized by beavers and the ponds overflow to the lake. From the eastern section of the lake the outlet flows southeast into Lake Panache. Although the difference in elevation is approximately 79 feet between the two lakes, the overflow from Little Panache Lake is quite small and the lake is almost landlocked.



Cottage development around the lake began approximately 40 years ago and now the lake is almost circled by cottages and permanent homes. Most of the available sites close to the lake have been built on and the current trend is the conversion of cottages into permanent homes. At the present time, this type of development is occurring slowly.

BIOLOGICAL SURVEY:

Between July 4 and October 8, 1968, staff of the Biology Branch visited the lake six times to collect samples and make physical measurements. Two sampling points were established in Little Panache Lake and one point was established in a larger lake, Lake Panache, for comparison. A complete report on the survey has been prepared by the Biology Branch and will be issued separately.

Survey Results

The following conclusion is contained in the biological report:

"Eutrophication in Little Lake Panache was shown by oxygen depletion and high nitrate, ammonia, silica, iron and total and soluble phosphorus concentrations in the lower waters; depression of pH in the deeper strata; high standing crops of phytoplankton throughout the sampling period; and the development of a "water bloom" dominated by the blue-green



algae Aphanizomenon flos-aquae and Anabaena spiroides."

In addition, the report pointed out that since the predominate algae are of the blue-green type they can use atmospheric nitrogen and do not depend upon dissolved nitrates for their nitrogen supply. Phosphate, therefore, appeared to be the growth-limiting nutrient because the required trace elements are usually present in natural waters.

POLLUTION SURVEY:

Because the preliminary results of the biological survey indicated that phosphates were the controlling factor in this algae bloom, a pollution survey of the shore area was conducted to determine what contribution could be attributed to the development around the lake. The survey was carried out jointly by the Sudbury & District Health Unit and this Commission during the week of September 2, 1968. Additional inspections were made on September 17.

Information was obtained about water supplies, sanitary waste disposal, kitchen waste disposal and laundry practices and, where possible, the residents were interviewed to obtain more detailed information. Bacteriological samples were obtained using Department of Health sample bottles. A sample of the survey information sheets which were filled out at each inspection point is included in Appendix B.

RESULTS OF POLLUTION SURVEY:

A summary of the information obtained during the survey is provided in Table 1 on page 7B. The results of the bacteriological samples obtained during the survey are presented in Appendix A.

Because of time limitations all of the properties around the lake could not be inspected. A total of 50 inspections were made, which represents slightly more than 70 per cent of the development on the lake, and 16 interviews were conducted. All of the properties surrounding the east section of the lake were inspected. The Sudbury & District Health Unit will be inspecting the remainder of the homes as time permits.

Permanent homes represent 30 per cent of the development on Little Lake Panache. There are proportionally more permanent residences on the east section than on the west section.

Slightly more than half of the homes use water from the lake. Two people reported that they brought their drinking water from the city and the remainder of the homes are supplied by wells.

Three-quarters of the residences use pit privies for the disposal of sanitary wastes. Septic tanks serve the

rest of the homes. Generally, the disposal of sanitary wastes is satisfactory but there are several cases where pit privies and septic tanks have been improperly installed.

Approximately 94 per cent of the homes inspected had sink drains running directly onto the ground or had slop pails which were dumped on the surface of the ground. Only three of the places visited used leaching pits for sink waste disposal.

Steam baths were present at at least 80 per cent of the properties on the lake. Most of these baths were located close to the edge of the lake and many had drains running directly into the lake.

Laundry waste disposal practices were determined by interviewing the home owners. In the 16 interviews conducted during the survey it was learned that eight homes, or 50 per cent, discharge laundry wastes directly to the lake from the steam baths. Two residents reported that they did their laundry in the steam baths but removed the wastewater by bucket for disposal on the ground.

Bacteriological samples were obtained at 23 locations and a map showing the sample points is included in Appendix A. Several of the high coliform counts, particularly from the east portion of the lake, indicate that domestic wastes are gaining access to the lake. The presence of faecal coliforms, normal

TABLE I

LITTLE PANACHE LAKE

Pollution Survey Results

	<u>East</u>	<u>West</u>	<u>Total</u>
<u>Residences:</u>			
Permanent	10	6	16
Camps	13	21	34
TOTAL	23	27	50
<u>Water Supply:</u>			
Lake	10	17	27
Wells	13	8	21
City	-	2	2
<u>Sanitary Waste:</u>			
Septic Tank	4	9	13
Pit Privy	21	20	41*
<u>Kitchen Sink Waste:</u>			
Leaching Pit	-	3	3
Onto Ground	23	24	47
<u>Steam Baths:</u>			
Number	17	23	40
Laundry Waste to Lake	5	3	8

\* Note: 4 homes Use Both Pit Privies  
and Septic Tanks

inhabitants of the intestinal tract of warm-blooded animals, in one-quarter of the samples confirms that domestic pollution is taking place. Malfunctioning or improperly constructed private disposal systems appear to be causing the bacteriological contamination.

It should be noted in passing that all surface waters should be disinfected before consumption. This can be accomplished by boiling for 15 minutes or by suitable chemical disinfection.

#### DISCUSSION:

Eutrophication is the natural aging process which takes place in all lakes. Nutrient deficient lakes over a long period of time are gradually enriched by the natural inflow of nutrients and minerals from the watershed. When there are sufficient nutrients to permit abundant growths of algae and higher plant forms, the lake is considered to be eutrophic or highly productive. As time progresses, the lake slowly fills in with inflowing material and material produced in the body of the lake itself and becomes a marsh or swamp. The biological survey points out that although eutrophication is a slow process, it can be dramatically accelerated by the artificial addition of nutrients from domestic and industrial wastes and agricultural run-off.

In the case of Little Panache Lake the process has been greatly accelerated by the artificial addition of phosphate. Detergents, which have been in general use for many years, are approximately 50 per cent by weight phosphate compounds. The pollution survey determined that most of the cottages and homes had no disposal systems for laundry and sink wastes. Because of detergents, they are the major sources of phosphate in domestic wastes. Since the time that detergents came into general use, approximately 25 years ago, and accounting for both the permanent homes and camps the present phosphate concentration in the lake could have been contributed by an average discharge of only ten pounds of detergent per residence per year. Because the lake is nearly landlocked most of the materials that flow into it are trapped and, in this way, the nutrient concentration builds up over a period of time. It is certain, therefore, that the lack of suitable disposal systems for laundry and sink wastes has been a major factor in the eutrophication of Little Panache Lake.

The biological report pointed out that, because of the physical nature of the lake, recurring algal blooms will develop in the future. In order to prevent the algae problems from becoming progressively worse each year, it will be necessary to stop the discharge of all domestic wastewaters into

the lake. This will involve the construction of individual waste disposal systems capable of handling sanitary, sink and laundry wastes to meet the requirements of the Sudbury & District Health Unit. On November 27, 1968 the Little Lake Panache Residents and Campers Association was formed and it is expected that this organization will be able to provide assistance in policing the pollution control measures.

The use of copper sulphate to provide temporary control of nuisance conditions was discussed in the biological report. This type of treatment would cost approximately \$1,100 for chemicals alone for one treatment and it is likely that more than one treatment would be required per year. It was also pointed out that copper sulphate would delay rather than prevent the occurrence of water-bloom conditions. Because of the landlocked nature of the lake, the copper would be trapped in the water and the accumulation of copper to the Commission's recommended limit of 1.0 mg/l would occur in approximately four treatments. It is felt that the temporary relief provided by the use of copper sulphate could not justify the cost to the residents of such a treatment programme. Flow augmentation in the quantities required to provide a flushing action in the lake is impractical because of the distance from a suitable water source and the topography of the surrounding area.

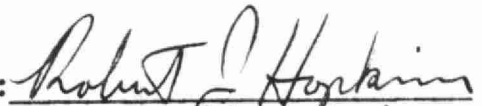
Because the problem of artificially accelerated eutrophication is becoming more widespread in Ontario each year, the OWRC has started a research programme to determine what can be done to reduce or eliminate the problems caused by nutrient enrichment in small lakes. No recommendations regarding treatment of Little Panache Lake will be made until further research makes positive control methods available.

RECOMMENDATIONS:

1. All domestic wastewaters, including laundry, sink and sanitary wastes, must be directed to a suitable disposal system and malfunctioning or improperly constructed disposal systems must be altered to comply with the requirements of the Sudbury & District Health Unit.

2. In order to ensure the maximum effectiveness of this pollution abatement programme, the Little Lake Panache Residents and Campers Association should take an active role in the surveillance of the waste disposal practices in the watershed area.

3. Chemical treatment of the lake is not recommended because positive treatment methods are not available at the present time.

Prepared by:   
R. J. Hopkins, Engineer,  
Division of Sanitary  
Engineering.



APPENDIX A

Bacteriological Results

<u>Location</u>		<u>Total Coliform Organisms</u> <u>per 100 ml.</u>	<u>Faecal Coliform Organisms</u> <u>per 100 ml.</u>
East:	1	2,800	0
	2	8,200	4
	3	11,000	0
	4	300	0
	5	1,000	230
	6	GT. 39	2
	7	34	0
	8	10	0
	9	GT. 39	0
	10	34	0
	11	30	0
	12	GT. 39	2
West:	1	2,400	0
	2	12	0
	3	12	10
	4	12	0
	5	GT. 39	0
	6	40	0
	7	0	0
	8	130	12
	9	2	0
	10	36	0
	11	0	0

NOTE: MPN Tests performed by Department of Health Regional Laboratory in North Bay.

Abbreviation GT. means Greater Than.

KEY:

PAVED ROAD

MUNICIPAL BOUNDARY

SAMPLE POINTS:

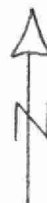
BIOLOGICAL

BACTERIOLOGICAL



MILES

0 0.1 0.2 0.3 0.4 0.5



LOUISE  
TOWNSHIP

DIEPPE  
TOWNSHIP

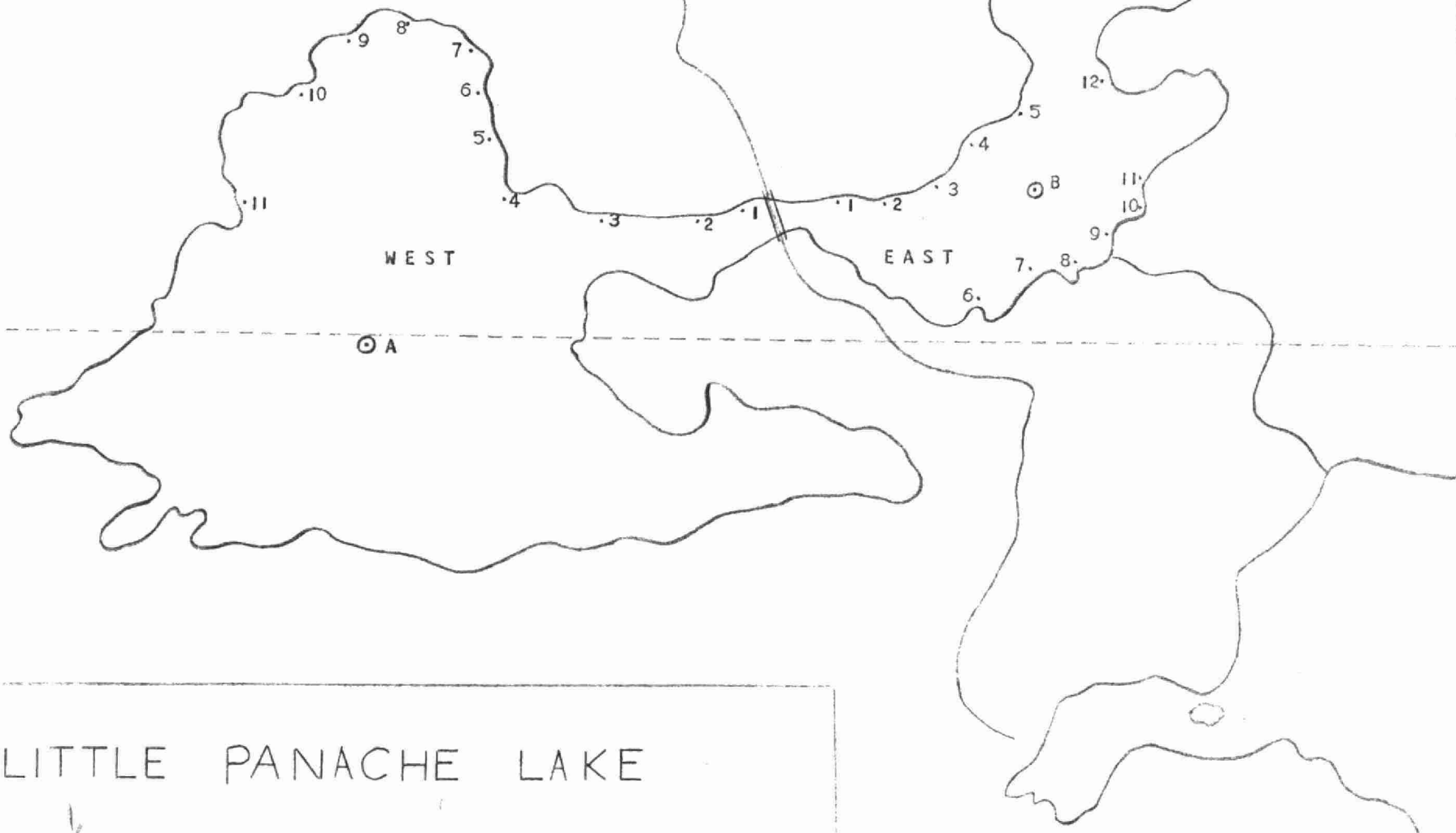
WEST

EAST

⊙ A

⊙ B

LITTLE PANACHE LAKE



WATERSHED SURVEY  
(SUPPLIED BY SUDBURY AND DISTRICT HEALTH UNIT)

STREET

DATE

TIME

INSPECTOR

PROPERTY	HOUSE NO.	LOT NO.	PLAN NO.	PARCEL NO.	CONC. NO.	DIMENSIONS			
OWNER	NAME			PERMANENT ADDRESS			TELEPHONE NO.		
OCCUPANCY	PERMANENT	CAMP	NO. OF ADULTS		NO. OF CHILDREN		NO. OF BEDROOMS		
WATER	RAW	CHLOR.	WELL	LAKE	OTHER	TAP TEST		LAKE TEST	
						T.C.O.	E. COLI	T.C.O.	E. COLI
SEWAGE DISPOSAL	SEPTIC TANK	PIT PRIVY	PAIL PRIVY	GREASE PIT	CHEMICAL TOILET	GARBAGE DISPOSAL			
FIXTURES	WATER CLOSETS	SHOWERS	KITCHEN SINKS	BATH TUBS	BASINS	LAUNDRY TUBS	AUTO. WASH	GARBAGE GRINDER	STEAM BATH
REMARKS									

PLAN

APPENDIX B  
SURVEY CHECK LIST



ONTARIO WATER RESOURCES COMMISSION  
801 BAY STREET  
TORONTO 5